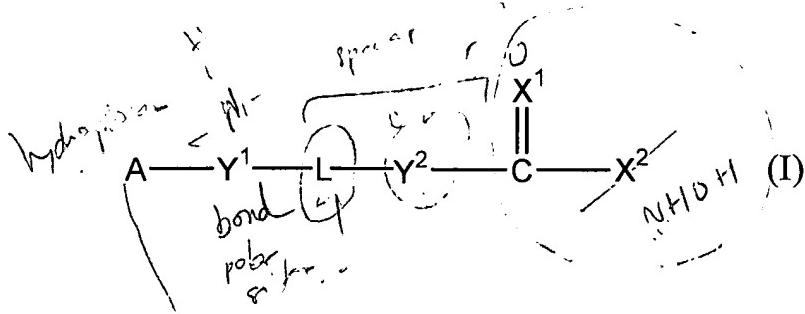


WHAT IS CLAIMED IS:

- 1 1. A method of inhibiting histone deacetylation activity in cells comprising contacting the
2 cells with an effective amount of a compound of formula (I), thereby treating one or more
3 disorders mediated by histone deacetylase; said compound having the following formula:



wherein

A is a cyclic moiety selected from the group consisting of C₃₋₁₄ cycloalkyl, 3-14 membered heterocycloalkyl, C₄₋₁₄ cycloalkenyl, 3-8 membered heterocycloalkenyl, aryl, or heteroaryl; the cyclic moiety being optionally substituted with alkyl, alkenyl, alkynyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, alkylcarbonyloxy, alkyloxycarbonyl, alkylcarbonyl, alkylsulfonylamino, aminosulfonyl, or alkylsulfonyl; or A is a saturated branched C₃₋₁₂ hydrocarbon chain or an unsaturated branched C₃₋₁₂ hydrocarbon chain optionally interrupted by -O-, -S-, -N(R^a)-, -C(O)-, -N(R^a)-SO₂-, -SO₂-N(R^a)-, -N(R^a)-C(O)-O-, -O-C(O)-N(R^a)-, -N(R^a)-C(O)-N(R^b)-, -O-C(O)-, -C(O)-O-, -O-SO₂-, -SO₂-O-, or -O-C(O)-O-, where each of R^a and R^b, independently, is hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or haloalkyl; each of the saturated and the unsaturated branched hydrocarbon chain being optionally substituted with alkyl, alkenyl, alkynyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, alkylcarbonyloxy, alkyloxycarbonyl, alkylcarbonyl, alkylsulfonylamino, aminosulfonyl, or alkylsulfonyl; each of Y¹ and Y², independently, is -CH₂-, -O-, -S-, -N(R^c)-, -N(R^c)-C(O)-O-, -O-C(O)-N(R^c)-, -N(R^c)-C(O)-N(R^d)-, -O-C(O)-O-, or a bond; each of R^c and R^d, independently, being hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or haloalkyl;

L is a straight C₂₋₁₂ hydrocarbon chain optionally containing at least one double bond, at least one triple bond, or at least one double bond and one triple bond; said hydrocarbon chain being optionally substituted with C₁₋₄ alkyl, C₂₋₄ alkenyl, C₂₋₄ alkynyl, C₁₋₄ alkoxy, hydroxyl, halo, amino, nitro, cyano, C₃₋₅ cycloalkyl, 3-5 membered heterocycloalkyl,

29 monocyclic aryl, 5-6 membered heteroaryl, C₁₋₄ alkylcarbonyloxy, C₁₋₄ alkyloxycarbonyl,
30 C₁₋₄ alkylcarbonyl, or formyl; and further being optionally interrupted by -O-, -N(R^e)-,
31 -N(R^e)-C(O)-O-, -O-C(O)-N(R^e)-, -N(R^e)-C(O)-N(R^f)-, or -O-C(O)-O-; each of R^e and R^f,
32 independently, being hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or
33 haloalkyl;

34 X¹ is O or S; and

35 X² is -OR¹, -SR¹, -NR³-OR¹, -NR³-SR¹, -C(O)-OR¹, -CHR⁴-OR¹, -N=N-C(O)-N(R³)₂,
36 or -O-CHR⁴-O-C(O)-R⁵, where each of R¹ and R², independently, is hydrogen, alkyl,
37 hydroxylalkyl, haloalkyl, or a hydroxyl protecting group; R³ is hydrogen, alkyl, alkenyl,
38 alkynyl, alkoxy, hydroxylalkyl, hydroxyl, haloalkyl, or an amino protecting group; R⁴ is
39 hydrogen, alkyl, hydroxylalkyl, or haloalkyl; R⁵ is alkyl, hydroxylalkyl, or haloalkyl; and
40 provided that when L is a C₂₋₃ hydrocarbon containing no double bonds and X² is -OR¹, Y¹ is
41 not a bond and Y² is not a bond;

42 or a salt thereof; and

43 determining whether the level of acetylated histones in the treated cells is higher than
44 in untreated cells under the same conditions.

1 2. The method of claim 1, wherein X¹ is O.

1 3. The method of claim 1, wherein X¹ is S.

1 4. The method of claim 1, wherein X² is -OR¹, -NR³-OR¹, -C(O)-OR¹, -CHR⁴-OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵.

1 5. The method of claim 1, wherein X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵.

1 6. The method of claim 1, wherein each of Y¹ and Y², independently, is -CH₂-, -O-,
2 -N(R^c)-, or a bond.

1 7. The method of claim 1, wherein each of Y¹ and Y², independently, is -CH₂- or a bond.

1 8. The method of claim 1, wherein L is a saturated hydrocarbon chain.

- 1 9. The method of claim 8, wherein L is a C₃₋₈ hydrocarbon chain substituted with C₁₋₂ alkyl,
2 C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 10. The method of claim 1, wherein L is an unsaturated hydrocarbon chain containing at least
2 one double bond and no triple bond.
- 1 11. The method of claim 10, wherein L is an unsaturated C₄₋₈ hydrocarbon chain substituted
2 with C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 12. The method of claim 10, wherein the double bond is in trans configuration.
- 2 13. The method of claim 1, wherein L is an unsaturated hydrocarbon chain containing at least
3 one double bond and one triple bond.
- 1 14. The method of claim 13, wherein L is an unsaturated C₄₋₈ hydrocarbon chain substituted
2 with C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 15. The method of claim 13, wherein the double bond is in trans configuration.
- 1 16. The method of claim 1, wherein A is a C₅₋₈ cycloalkenyl or 5-8 membered heteroalkenyl
2 containing at least one double bonds.
- 1 17. The method of claim 1, wherein A is phenyl, naphthyl, indanyl, or tetrahydronaphthyl.
- 1 18. The method of claim 1, wherein A is phenyl optionally substituted with alkyl alkenyl,
2 alkynyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, or amino.
- 1 19. The method of claim 18, wherein L is a saturated C₃₋₈ hydrocarbon chain substituted with
2 C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 20. The method of claim 19, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^a)-, or a
3 bond.

- 1 21. The method of claim 18, wherein L is an unsaturated C₄₋₈ hydrocarbon chain containing
2 at least one double bond and no triple bond, said unsaturated hydrocarbon chain optionally
3 substituted with C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or
4 -N(C₁₋₂ alkyl)₂.
- 1 22. The method of claim 21, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 23. The method of claim 18, wherein L is an unsaturated hydrocarbon chain containing at
2 least one double bond and one triple bond, optionally substituted with C₁₋₂ alkyl, C₁₋₂ alkoxy,
3 hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 24. The method of claim 23, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 25. The method of claim 1, wherein A is a saturated branched C₄₋₁₀ hydrocarbon chain
2 optionally interrupted by -N(R^a)-, -N(R^a)-C(O)-O-, -O-C(O)-N(R^a)-,
3 -N(R^a)-C(O)-N(R^b)-, -O-C(O)-, or -C(O)-O- where each of R^a and R^b, independently, is
4 hydrogen, alkyl, alkoxy, hydroxylalkyl, or hydroxyl.
- 1 26. The method of claim 25, wherein L is a saturated C₃₋₈ hydrocarbon chain substituted with
2 C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 27. The method of claim 26, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^a)-, or a
3 bond.
- 1 28. The method of claim 25, wherein L is an unsaturated C₄₋₈ hydrocarbon chain containing
2 only double bonds, said unsaturated hydrocarbon chain optionally substituted with C₁₋₂ alkyl,
3 C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.

- 1 29. The method of claim 28, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 30. The method of claim 25, wherein L is an unsaturated hydrocarbon chain containing at
2 least one double bond and one triple bond, optionally substituted with C₁₋₂ alkyl, C₁₋₂ alkoxy,
3 hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 31. The method of claim 30, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 32. The method of claim 1, wherein A is an unsaturated branched C₄₋₁₀ hydrocarbon chain
2 optionally interrupted by -N(R^a)-, -N(R^a)-C(O)-O-, -O-C(O)-N(R^a)-, -N(R^a)-C(O)-N(R^b)-,
3 -O-C(O)-, or -C(O)-O- where each of R^a and R^b, independently, is hydrogen, alkyl, alkoxy,
4 hydroxylalkyl, or hydroxyl.
- 1 33. The method of claim 32, wherein A contains only double bonds.
- 1 34. The method of claim 33, wherein L is a saturated C₃₋₈ hydrocarbon chain optionally
2 substituted with C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 35. The method of claim 34, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 36. The method of claim 33, wherein L is an unsaturated C₄₋₈ hydrocarbon chain containing
2 only double bonds, said unsaturated hydrocarbon chain optionally being substituted with C₁₋₂
3 alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.

- 1 37. The method of claim 36, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 38. The method of claim 33, wherein L is an unsaturated C₄₋₈ hydrocarbon chain containing
2 at least one double bond and one triple bond, said unsaturated hydrocarbon chain optionally
3 being substituted with C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂
4 alkyl)₂.
- 1 39. The method of claim 38, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 40. The method of claim 1, wherein said compound is 5-phenyl-2,4-pentadienoic acid, 3-
2 methyl-5-phenyl-2,4-pentadienoic acid, 4-methyl-5-phenyl-2,4-pentadienoic acid, 4-chloro-
3 5-phenyl-2,4-pentadienoic acid, 5-(4-dimethylaminophenyl)-2,4-pentadienoic acid, 5-(2-
4 furyl)-2,4-pentadienoic acid, 5-phenyl-2-en-4-yn-pentanoic acid, 6-phenyl-3,5-hexadienoic
5 acid, 7-phenyl-2,4,6-heptatrienoic acid, 8-phenyl-3,5,7-octatrienoic acid, potassium 2-oxo-6-
6 phenyl-3,5-hexadienoate, potassium 2-oxo-8-phenyl-3,5,7-octatrienoate,
7 cinnamoylhydroxamic acid, methyl-cinnamoylhydroxamic acid, 4-
8 cyclohexanebutyroylhydroxamic acid, benzylthioglycoloylhydroxamic acid, 5-
9 phenylpentanoylhydroxamic acid, 5-phenyl-2,4-pentadienoylhydroxamic acid, N-methyl-5-
10 phenyl-2,4-pentadienoylhydroxamic acid, 3-methyl-5-phenyl-2,4-pentadienoylhydroxamic
11 acid, 4-methyl-5-phenyl-2,4-pentadienoyl hydroxamic acid, 4-chloro-5-phenyl-2,4-
12 pentadienoylhydroxamic acid, 5-(4-dimethylaminophenyl)-2,4-pentadienoylhydroxamic acid,
13 5-phenyl-2-en-4-yn-pantanoylhydroxamic acid, 5-(2-furyl)-2,4-pentadienoylhydroxamic
14 acid, 6-phenylhexanoylhydroxamic acid, 6-phenyl-3,5-hexadienoylhydroxamic acid, N-
15 methyl-6-phenyl-3,5-hexadienoylhydroxamic acid, 7-phenylheptanoylhydroxamic acid, 7-
16 phenyl-2,4,6-hepta-trienoylhydroxamic acid or 8-phenyloctanoylhydroxamic acid.
- 1 41. The method of claim 1, wherein said compound is 5-phenyl-2,4-pentadienoic acid, 8-
2 phenyl-3,5,7-octatrienoic acid, potassium 2-oxo-8-phenyl-3,5,7-octatrienoate,

benzylthioglycoloylhydroxamic acid, 5-phenyl-2,4-pentadienoylhydroxamic acid, 6-phenylhexanoylhydroxamic acid, 7-phenyl-2,4,6-hepta-trienoylhydroxamic acid, or 8-phenyloctanoylhydroxamic acid.

1 42. The method of claim 1, wherein the cells are treated with a compound of formula (I) in
2 vivo.

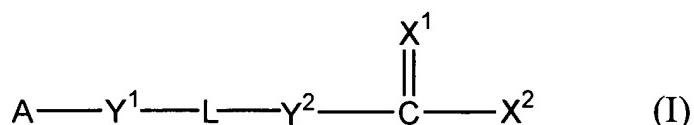
1 43. The method of claim 1, wherein the cells are treated with a compound of formula (I) in
2 vitro.

1 44. The method of claim 1, wherein the cells being treated are cancerous.

1 45. The method of claim 1, wherein the disorder is selected from the group consisting of
2 cancer, hemoglobinopathies, thalassemia, sickle cell anemia, cystic fibrosis, protozoan
3 infection, adrenoleukodystrophy, alpha-1 anti-trypsin, retrovirus gene vector reactivation,
4 wound healing, hair growth, peroxisome biogenesis disorder, and adrenoleukodystrophy.

1 46. The method of claim 1, wherein the disorder is cancer, cystic fibrosis, or
2 adrenoleukodystrophy.

1 47. A method of inhibiting histone deacetylase in cells comprising contacting the cells with
2 an effective amount of a compound of formula (I):



5 wherein

A is phenyl optionally substituted with alkyl alkenyl, alkynyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, or amino;

each of Y¹ and Y², independently, is -CH₂-, -O-, -S-, -N(R^c)-, or a bond; where R^c is hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or haloalkyl;

10 L is a straight C₂-12 hydrocarbon chain optionally containing at least one double bond,
11 at least one triple bond, or at least one double bond and one triple bond; said hydrocarbon
12 chain being optionally substituted with C₁-4 alkyl, C₂-4 alkenyl, C₂-4 alkynyl, C₁-4 alkoxy,
13 hydroxyl, halo, amino, nitro, cyano, C₃-5 cycloalkyl, 3-5 membered heterocycloalkyl,
14 monocyclic aryl, 5-6 membered heteroaryl, C₁-4 alkylcarbonyloxy, C₁-4 alkyloxycarbonyl, C₁-
15 4 alkylcarbonyl, or formyl; and further being optionally interrupted by -O-, -N(R^e)-,
16 -N(R^e)-C(O)-O-, -O-C(O)-N(R^e)-, -N(R^e)-C(O)-N(R^f)-, or -O-C(O)-O-; each of R^e and R^f,
17 independently, being hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or
18 haloalkyl;

19 X¹ is O or S; and

20 X² is -OR¹, -SR¹, -NR³-OR¹, -NR³-SR¹, -C(O)-OR¹, -CHR⁴-OR¹, -N=N-C(O)-N(R³)₂,
21 or -O-CHR⁴-O-C(O)-R⁵; where each of R¹ and R², independently, is hydrogen, alkyl,
22 hydroxylalkyl, haloalkyl, or a hydroxyl protecting group; R³ is hydrogen, alkyl, alkenyl,
23 alkynyl, alkoxy, hydroxylalkyl, hydroxyl, haloalkyl, or an amino protecting group; R⁴ is
24 hydrogen, alkyl, hydroxylalkyl, or haloalkyl; R⁵ is alkyl, hydroxylalkyl, or haloalkyl; and
25 provided that when L is a C₂-3 hydrocarbon containing no double bonds and X² is -OR¹, Y¹ is
26 not a bond and Y² is not a bond;

27 or a salt thereof; and

28 determining whether the level of acetylated histones in the treated cells is higher than
29 in untreated cells under the same conditions.

1 48. The method of claim 47, wherein L is a saturated C₃-8 hydrocarbon chain substituted with
2 C₁-2 alkyl, C₁-2 alkoxy, hydroxyl, -NH₂, -NH(C₁-2 alkyl), or -N(C₁-2 alkyl)₂.

1 49. The method of claim 48, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^a)-, or a
3 bond.

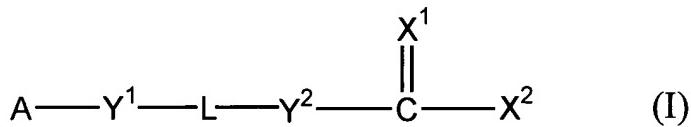
1 50. The method of claim 47, wherein L is an unsaturated C₄-8 hydrocarbon chain containing
2 only double bonds, said unsaturated hydrocarbon chain optionally substituted with C₁-2 alkyl,
3 C₁-2 alkoxy, hydroxyl, -NH₂, -NH(C₁-2 alkyl), or -N(C₁-2 alkyl)₂.

1 51. The method of claim 50, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.

1 52. The method of claim 47, wherein L is an unsaturated hydrocarbon chain containing at
2 least one double bond and one triple bond, optionally substituted with C₁₋₂ alkyl, C₁₋₂ alkoxy,
3 hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.

1 53. The method of claim 53, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.

1 54. A method of treating a histone deacetylase-mediated disorder comprising administering
2 to a subject in need thereof a therapeutically effective amount of compound of formula (I):



5 wherein

A is a cyclic moiety selected from the group consisting of C₃₋₁₄ cycloalkyl, 3-14 membered heterocycloalkyl, C₄₋₁₄ cycloalkenyl, 4-14 membered heterocycloalkenyl, monocyclic aryl, or heteroaryl; the cyclic moiety being optionally substituted with alkyl, alkenyl, alkynyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, alkylcarbonyloxy, alkyloxycarbonyl, alkylcarbonyl, alkylsulfonylamino, aminosulfonyl, or alkylsulfonyl; or A is a saturated branched C₃₋₁₂ hydrocarbon chain or an unsaturated branched C₃₋₁₂ hydrocarbon chain optionally interrupted by -O-, -S-, -N(R^a)-, -C(O)-, -N(R^a)-SO₂-, -SO₂-N(R^a)-, -N(R^a)-C(O)-O-, -O-C(O)-N(R^a)-, -N(R^a)-C(O)-N(R^b)-, -O-C(O)-, -C(O)-O-, -O-SO₂-, -SO₂-O-, or -O-C(O)-O- where each of R^a and R^b, independently, is hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or haloalkyl; each of the saturated and the unsaturated branched hydrocarbon chain being optionally substituted with alkyl, alkenyl, alkynyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, amino, alkylcarbonyloxy,

18 alkyloxycarbonyl, alkylcarbonyl, alkylcarbonylamino, aminocarbonyl, alkylsulfonylamino,
19 aminosulfonyl, or alkylsulfonyl;

20 each of Y¹ and Y², independently, is -CH₂-, -O-, -S-, -N(R^c)-, -N(R^c)-C(O)-O-,
21 -O-C(O)-N(R^c)-, -N(R^c)-C(O)-N(R^d)-, -O-C(O)-O-, or a bond; each of R^c and R^d,
22 independently, being hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or
23 haloalkyl;

24 L is a straight C₃₋₁₂ hydrocarbon chain optionally containing at least one double bond,
25 at least one triple bond, or at least one double bond and one triple bond; said hydrocarbon
26 chain being optionally substituted with C₁₋₄ alkyl, C₂₋₄ alkenyl, C₂₋₄ alkynyl, C₁₋₄ alkoxy,
27 hydroxyl, halo, amino, nitro, cyano, C₃₋₅ cycloalkyl, 3-5 membered heterocycloalkyl,
28 monocyclic aryl, 5-6 membered heteroaryl, C₁₋₄ alkylcarbonyloxy, C₁₋₄ alkyloxycarbonyl, C₁₋
29 ₄ alkylcarbonyl, or formyl; and further being optionally interrupted by -O-, -N(R^e)-,
30 -N(R^e)-C(O)-O-, -O-C(O)-N(R^e)-, -N(R^e)-C(O)-N(R^f)-, or -O-C(O)-O-; each of R^e and R^f,
31 independently, being hydrogen, alkyl, alkenyl, alkynyl, alkoxy, hydroxylalkyl, hydroxyl, or
32 haloalkyl;

33 X¹ is O or S; and

34 X² is -OR¹, -SR¹, -NR³-OR¹, -NR³-SR¹, -C(O)-OR¹, -CHR⁴-OR¹, -N=N-C(O)-N(R³)₂,
35 or -O-CHR⁴-O-C(O)-R⁵; where each of R¹ and R², independently, is hydrogen, alkyl,
36 hydroxylalkyl, haloalkyl, or a hydroxyl protecting group; R³ is hydrogen, alkyl, alkenyl,
37 alkynyl, alkoxy, hydroxylalkyl, hydroxyl, haloalkyl, or an amino protecting group; R⁴ is
38 hydrogen, alkyl, hydroxylalkyl, or haloalkyl; R⁵ is alkyl, hydroxylalkyl, or haloalkyl; and
39 provided that when L is a C₂₋₃ hydrocarbon containing no double bonds and X² is -OR¹, Y¹ is
40 not a bond and Y² is not a bond;

41 or a salt thereof.

1 55. The method of claim 54, wherein A is phenyl optionally substituted with alkyl alkenyl,
2 alkynyl, alkoxy, hydroxyl, hydroxylalkyl, halo, haloalkyl, or amino.

1 56. The method of claim 55, wherein L is a saturated C₃₋₈ hydrocarbon chain substituted with
2 C₁₋₂ alkyl, C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.

- 1 57. The method of claim 56, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^a)-, or a
3 bond.
- 1 58. The method of claim 55, wherein L is an unsaturated C₄₋₈ hydrocarbon chain containing
2 only double bonds, said unsaturated hydrocarbon chain optionally substituted with C₁₋₂ alkyl,
3 C₁₋₂ alkoxy, hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 59. The method of claim 58, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 60. The method of claim 55, wherein L is an unsaturated hydrocarbon chain containing at
2 least one double bond and one triple bond, optionally substituted with C₁₋₂ alkyl, C₁₋₂ alkoxy,
3 hydroxyl, -NH₂, -NH(C₁₋₂ alkyl), or -N(C₁₋₂ alkyl)₂.
- 1 61. The method of claim 60, wherein X¹ is O; X² is -OR¹, -NR³-OR¹, -C(O)OR¹, or
2 -O-CHR⁴-O-C(O)-R⁵; and each of Y¹ and Y², independently, is -CH₂-, -O-, -N(R^c)-, or a
3 bond.
- 1 62. The method of claim 54, wherein said disorder is selected from the group consisting of
2 cancer, hemoglobinopathies, thalassemia, sickle cell anemia, cystic fibrosis, protozoan
3 infection, adrenoleukodystrophy, alpha-1 anti-trypsin, retrovirus gene vector reactivation,
4 wound healing, hair growth, peroxisome biogenesis disorder, and adrenoleukodystrophy.
- 1 63. The method of claim 54, wherein said disorder is cancer, cystic fibrosis, or
2 adrenoleukodystrophy.
- 1 64. The method of claim 54, wherein said compound 5-phenyl-2,4-pentadienoic acid, 3-
2 methyl-5-phenyl-2,4-pentadienoic acid, 4-methyl-5-phenyl-2,4-pentadienoic acid, 4-chloro-
3 5-phenyl-2,4-pentadienoic acid, 5-(4-dimethylaminophenyl)-2,4-pentadienoic acid, 5-(2-
4 furyl)-2,4-pentadienoic acid, 5-phenyl-2-en-4-yn-pentanoic acid, 6-phenyl-3,5-hexadienoic

10 phenyl-2,4-pentadienoylhydroxamic acid, 3-methyl-5-phenyl-2,4-pentadienoylhydroxamic
11 acid, 4-methyl-5-phenyl-2,4-pentadienoyl hydroxamic acid, 4-chloro-5-phenyl-2,4-
12 pentadienoylhydroxamic acid, 5-(4-dimethylaminophenyl)-2,4-pentadienoylhydroxamic acid,
13 5-phenyl-2-en-4-yn-pentanoylhydroxamic acid, 5-(2-furyl)-2,4-pentadienoylhydroxamic
14 acid, 6-phenylhexanoylhydroxamic acid, 6-phenyl-3,5-hexadienoylhydroxamic acid, N-
15 methyl-6-phenyl-3,5-hexadienoylhydroxamic acid, 7-phenylheptanoylhydroxamic acid, 7-
16 phenyl-2,4,6-hepta-trienoylhydroxamic acid or 8-phenyloctanoylhydroxamic acid.

1 65. The method of claim 54, wherein said compound is 5-phenyl-2,4-pentadienoic acid, 8-
2 phenyl-3,5,7-octatrienoic acid, potassium 2-oxo-8-phenyl-3,5,7-octatrienoate,
3 benzylthioglycoloylhydroxamic acid, 5-phenyl-2,4-pentadienoylhydroxamic acid, 6-
4 phenylhexanoylhydroxamic acid, 7-phenyl-2,4,6-hepta-trienoylhydroxamic acid, or 8-
5 phenyloctanoylhydroxamic acid.

6 66. The method of claim 54, wherein Y¹ is not a bond.